



Subject: Seats and seat belts for hot air balloon baskets
(Subpart F – Equipment)

Status: Consultation

Requirement reference:

- [EC 748/2012](#) (and amendments)
- [EASA Type Certification Procedure \(TCP\) PR.CERT.00001-001](#)
- EASA MB [02/04](#), MB Decision n° [7-2004](#)
- [CS 31HB](#)¹
- LFHLLS²
- CS 31HA (draft February 2003)³

Introductory note

Hereby presented Special Conditions have been classified as important SC and as such shall be subject to public consultation, in accordance with EASA Management Board decision EASA MB 02/04, MB Decision n° 7-2004 products certification procedure, 30 March 2004, Article 3 (2.) of which states:

"2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency."

Statement of Issue

EASA received an application for the airworthiness certification of a hot air balloon basket introduces seats for passengers and a lower basket wall on one side.

Neither the current Certification Specification for Hot Air Balloons CS-31HB Amendment 1 nor 14 CFR part 31 at Amendment 7 incorporate requirements for seats and seat belts.

The purpose of this Special Condition (SC) is to define the certification basis for seats and seat belt installation on hot air balloons.

Background

In the past seats have already been installed in balloon baskets in individual cases. Usually these were single seats designed to give disabled people the opportunity to take enjoy a ride in a hot air balloon. As the safe and controlled placement of the feet, the secure grabbing of hand hold during landing is vital for occupant safety it was usually not possible for people who cannot stand securely all the time to fly.

Balloon operators now request in general the option of seat installation because it provides among other advantages an attractive new option for passengers. However, seated persons might not be able to look over the basket rim (usually minimum 1.1 m). Therefore a solution could be to safely secure the passengers in the seats and allow for a significantly reduced basket rim height on one side of the basket to provide unobstructed view outside.

Based on the German Airworthiness Requirements for Hot Air Airships LFHLLS (Lufttüchtigkeitsforderungen für Heissluft-Luftschiffe, 13 November 1997, amended 10 March 1998), EASA has produced a final draft of the Certification Specifications for Hot Air Airships CS-31HA which is not yet published. Since this CS incorporates requirements for seats and seat belts and the loads in an emergency landing condition similar for a Hot Air Airship and a Hot Air Balloon, the EASA position is to apply the "CS 31HA.14(c) Occupant mass", "CS 31HB.27(d) Basket strength and proof of strength", "CS 31HA.43(d) Fitting factor", "CS 31HA.561(a) and (b)(1) Emergency landing conditions. General" and "CS 31HA.785(a), (c) and (d) Seats and seat belts" requirements for the seats, seat belts and supporting structure of the Hot Air Balloon.

¹ CS 31HB - Certification Specifications and Acceptable Means of Compliance for Hot Air Balloons

² LFHLLS – Airworthiness Requirements for Hot Air Airships, issued 13 November 1997, Germany (Lufttüchtigkeitsforderungen für Heißluft-Luftschiffe)

³ CS 31HA – Certification Specifications for Hot Air Airships, issued February 2003, JAA Core Group 9, Lighter-than-Air subgroup



Proposed Special Conditions

The following requirements from CS 31HA "BAPE draft" shall be applied in addition to CS 31HB Amdt. 1 as far as seats and seatbelts for hot air balloons are concerned.

Subpart B

CS 31HA.14(c)

Occupant mass. For calculation purposes, it should be assumed that the mass of an occupant is at least 86 kg (190 lb).

Subpart C

CS 31HB.27(d)

The basket must be of a generally robust design and afford the occupants adequate protection during a hard or fast landing. There must be no design feature that by reasonably envisaged distortion or failure would be likely to cause serious injury to the occupants. (See AMC 31HB.27(d))

CS 31HA.43(d)

For each seat, safety belt, and harness, its attachment to the structure must be shown, by analysis, tests, or both, to be able to withstand the inertia forces prescribed in CS 31HA.561 multiplied by a fitting factor of 1.33.

Subpart D

CS 31HA.561 General

(a) The Airship, although it may be damaged under emergency landing conditions, must be designed to protect each occupant under the conditions prescribed in this paragraph.

(b) The structure must be designed to give each occupant every reasonable chance of avoiding serious injury in a crash landing, when proper use of seat belts provided for in the design, in the following conditions:

(1) The occupant is subjected to the following ultimate inertia forces acting relative to the surrounding structure as well as independently of each other:

Forward 6 g,
Sideways 6 g,
Downward 6 g.

Backwards 6g (added by EASA Panel of Experts)

(2) and (3) *not applicable*

CS 31HA.785 Seats and seat belts

(a) Each seat and its supporting structure must be designed for an occupant mass in accordance with CS 31HA.14(c) and for the maximum load factors corresponding to the specified flight and ground load conditions, including the emergency landing conditions prescribed in CS 31HA.561.

(b) *not applicable*

(c) Each seat or berth shall be fitted with an individual approved seat belt or harness.

(d) Seat belts installed on the airship shall not fail under flight or ground load conditions or emergency landing conditions in accordance with CS 31HA.561(b) taking into account the geometrical arrangement of the belt attachment and the seat.

(e) *not applicable*

Conclusion

open

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